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INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for April, 1889, and is based upon reports of regular and voluntary observers of both countries.

On chart i the paths of the centres of thirteen areas of low pressure are shown; the average number traced for April, during the last sixteen years, being 10.4. This chart also exhibits the approximate paths of the centres of seven depressions traced over the north Atlantic Ocean; the limits of fog-belts west of the fortieth meridian, and the distribution of icebergs and field ice during the month. The severest storms were reported along the middle Atlantic and North Carolina coasts during the 6th and 7th, when heavy gales and unusually high tides caused great loss and damage to shipping and property. Along the trans-Atlantic routes the weather was seasonable and storms of unusual violence were not reported. Over and near the banks of Newfoundland there was a marked deficiency of Arctic ice. The areas of high and low pressure are discussed under their respective headings.

Chart ii exhibits the distribution of mean atmospheric pressure and temperature for the month. The mean temperature averaged above the normal in all districts, except the Florida Peninsula and the Rio Grande Valley, where the month was somewhat cooler than the average April. The greatest departures above the normal temperature were noted in the north-central districts, and at stations in adjoining parts of British America they amounted to 10°. At a number of stations west of the eighty-fifth meridian the highest absolute maximum temperature noted for April during the periods of observation was reported.

The distribution of precipitation for April, 1889, is shown on chart iii, and the normal precipitation for eighteen years is exhibited on chart iv. The month was remarkable for the great excess of rainfall in the lower Rio Grande valley; the heavy precipitation in the middle Atlantic states, and the marked deficiency of rainfall on the south Pacific coast. The current and normal precipitation for the month are discussed under "Precipitation."

Chart v exhibits the depth of snow on the ground at the close of the month, and the limits of freezing weather during April, 1889.

In the preparation of this REVIEW data from 2,098 stations have been used, classified as follows: 175 Signal Service stations; 119 monthly registers from United States Army post surgeons; 1,243 monthly registers from state weather service and voluntary observers; 24 Canadian stations; 177 stations through the Central Pacific Railway Company; 360 marine reports through the co-operation of the Hydrographic Office, United States Navy; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for April, 1889, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The difference between the mean pressure for April obtained from observations taken twice daily at the hours named and that determined from hourly observations varies at the stations named below, as follows: At Washington, D. C., Philadelphia, Pa., New York, N. Y., Boston, Mass., and Chicago, Ill., the mean of the 8 a. m. and 8 p. m. observations was higher by .007, .010, .008, 009, and .004, respectively, while at Saint Louis, Mo., and San Francisco, Cal., the mean of the observations taken at these hours was .001 and about .016, respectively, lower than the true mean pressure.

The mean pressure for April, 1889, was highest along the Pacific coast between the thirty-fifth and forty-eighth parallels, and from the north-central portions of the country southward to the Gulf and Florida coasts, where the values rose above 30.00, the highest mean reading, 30.06, being reported at Eureka, Cal. The mean pressure was lowest over the southern plateau region, where it fell to 29.85 at Keeler, Cal., and 29.86 at Yuma, Ariz., and was generally below 30.00 over the Rocky Mountain regions, in the Saint Lawrence Valley and Canadian Maritime Provinces, and in the Atlantic coast states north of the thirty-second parallel.

Compared with the pressure chart for March, 1889, an increase in pressure is shown east of the Mississippi River and the upper lakes, and along the Pacific coast. Over the entire central portion of the country from the Mississippi River to the Pacific coast districts there has been a decrease in mean pressure. The most marked increase in pressure has occurred along the coast of Nova Scotia, where the mean readings for April were .15 higher than in the preceding month. On the Pacific coast the increase amounted to .12 at Eureka, Cal., and Fort Canby, Wash. The greatest decrease in mean pressure was noted at stations in the Canadian Northwest Territories, where it amounted to more than .10. Over a greater portion of the Rocky Mountain districts and in the upper Missouri valley the decrease varied from .05 to .09. A general comparison with the pressure chart of the preceding month shows that while an area of high pressure occupied the upper Missouri and Red River of the North valleys in March, 1889, no well-defined area of high pressure appears on the chart for the current month; that a decided increase in pressure has occurred at stations in the Canadian Maritime Prov-

inces, and along the New England coasts, where in March the lowest readings were reported; that there has been a decrease of .06 to .07 within the area of low pressure over the southern plateau region, and that there has been a marked increase in pressure on the Pacific coast.

Compared with the normal pressure for April the mean pressure was above the normal, except in the Pacific coast states, at stations in Ontario, near Georgian Bay, in the Atlantic coast states south of the fortieth parallel, and in the Gulf States east of the Mississippi River. The greatest departures above the normal were shown in the Canadian Maritime Provinces, where they exceeded .10. Over the interior of the country the departures above the normal were most marked over the middle eastern slope of the Rocky Mountains, where they amounted to .10. The departures below the normal were greatest on the coasts of Virginia and North Carolina and over the southwest extremity of California, where they were more than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are given in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In April, 1889, the ranges were greatest from Lake Ontario east-southeast to the Atlantic coast, where they were more than 1.20, from which region they decreased westward to the Pacific coast, where they amounted to .40 on the extreme southern coast of California, and to less than .80 in Washington Territory. They were least over the southern extremity of Florida, where they amounted to but .30. Along the Atlantic coast the ranges varied from .30 at Key West, Fla., to 1.26 at Norfolk, Va., and 1.25 at New York City; between the eighty-second and ninety-second meridians, .57 at Cedar Keys, Fla., to 1.09 at Port Huron, Mich.; between the Mississippi River and the Rocky Mountains, .52 at San Antonio, Tex., to 1.14 at Saint Vincent, Minn.; in the plateau and Rocky Mountain regions, .44 at Yuma, Ariz., to .93 at Fort Custer, Mont.; on the Pacific coast, .40 at Los Angeles and San Diego, Cal., to .83 at Fort Canby, Washington Territory.

AREAS OF HIGH PRESSURE.

Eight well-defined areas of high pressure appeared within the region of observation during April, 1889, of which three advanced from the Pacific coast; three moved east-southeast from British America, and two were first observed over the northern slope of the Rocky Mountains. Four areas of high pressure reached the Atlantic coast, all of which advanced from west of the ninety-fifth meridian. Their average direction of movement west of the Atlantic coast was east to east-southeast. After reaching the Atlantic coast the areas moved north of east.

I.—This high area appeared in Montana on the 2d. The highest pressure was over Iowa on the 3d, over Missouri on the morning of the 4th, moved eastward to Ohio during the day, and was over eastern Pennsylvania on the morning of the 5th. The temperature fell from 14° to 22° in Montana on the 2d, and from 14° to 16° in Nebraska and Wyoming on the same day. On the 3d the cold wave extended over the Mississippi Valley, the greatest fall in temperature being 32° at Keokuk, Iowa. There had also been a fall in temperature of 16° to 20° in the Ohio Valley. During the 4th the cold wave passed eastward to the Atlantic coast, causing a fall in temperature of 20° in Virginia and Maryland, and 8° to 10° in the south Atlantic states. The following minimum temperatures were reported: 24° to 32° in the upper Mississippi valley on the morning of the 4th; 18° to 26° in the upper lake region, and 28° to 30° in the lower lake region on the 5th, and from 28° to 36° along the north Atlantic coast on the 7th.

II.—This high area moved from the northwest to Manitoba on the 4th, to Lake Superior on the 5th, and extended over the Lake region on the 6th, the pressure remaining highest over the lower lake region during the 7th and 8th. A fall in temperature of 5° to 10° occurred in the Lake region on the 5th. The area of cold extended southward over the Ohio Valley and Tennessee on the 6th, a fall of 20° being reported from Memphis and Nashville, Tenn.

III.—Number iii appeared over Montana on the 6th, increased in pressure and extended south to Colorado on the 7th. The highest pressure in this area was in Dakota on the 8th, and in Iowa on the 9th. On the 10th it passed over the southern portion of the Lake region, and on the 11th was on the middle and south Atlantic coasts. The night map of the 7th showed a fall of 20° in temperature extending from southern Wyoming over eastern Colorado to northern Texas. The temperature fell 10° in the Missouri Valley on the 8th, and from 5° to 10° over the Lake region on the 9th.

IV.—This area appeared over Manitoba on the 11th. The highest pressure was over Lake Superior on the 12th and 13th; north of Lake Huron on the 14th; over the Saint Lawrence Valley on the 15th, and over Nova Scotia on the 16th and 17th. The temperature fell from 10° to 18° over the upper lakes on the 11th, and from 10° to 14° over the lower lake region on the 12th. On the 13th the area of cold air extended over New England, the middle Atlantic states, the lower lake region, and the Ohio Valley. On the 14th the temperature fell from 12° to 20° in Tennessee, the south Atlantic and east Gulf states, and a still further fall of 8° to 10° occurred in the east Gulf states on the 15th.

V *a* and V *b*.—On the 16th the eastern limit of an area of high pressure appeared on the California coast. On the 17th the area of highest pressure had been translated to the coast of Washington Territory, where it remained during the 18th. During the 19th it moved southeastward to Colorado. During the 20th it was over Missouri and Iowa, and was joined on the 21st by another high area (v *a*) that was over Dakota on the 20th. On the 21st the pressure was highest over Wisconsin and Iowa. The area of highest pressure passed over the Lake region on the 22d and reached the Atlantic coast on the 23d, and moved thence northeastward to Nova Scotia on the 24th. The following changes in temperature occurred during the passage of this high area: a fall of 10° to 20° in the districts immediately west of the Missouri River on the 17th; 10° to 18° in northern Texas on the 18th; 10° to 20° in the Lake region and Ohio Valley on the 20th. On the 20th a fall of 10° to 20° occurred in Dakota, Minnesota, and Iowa, and a fall of 6° to 10° in Kentucky. On the 21st the area of cold extended from the Lake region to New England and as far south as Kentucky. It passed eastward to the Atlantic coast on the 22d, and extended over Tennessee.

VI.—This area of high pressure appeared on the Pacific coast on the 22d, and on the 23d was over Wyoming and Idaho. On the 24th it moved southeastward over Colorado to Texas, where it remained during the 25th, and extended so as to form a comparatively high area over Illinois and Indiana. The latter area was over the lower lakes on the 26th, the pressure giving away before an advancing low area from the west during the day. The temperature fell 20° in Montana on the 22d. The fall in temperature extended to the Missouri Valley on the 23d, and reached the upper lakes on the 24th, 22° fall in twenty-four hours being reported from Chicago. The cold-wave was over the lower lakes and extended southward to North Carolina on the 25th, and a still further fall in temperature occurred in southern Virginia and North Carolina on the 26th.

VII.—Area number vii appeared on the 25th over Washington Territory, was north of Montana on the 26th, and over Manitoba on the 27th. It remained nearly stationary on the 28th, the pressure increasing. On the 29th it moved southward to Wyoming and Colorado, extending northward over Dakota on the 30th, and a fall in pressure in the south portion of the high area left the highest pressure at the end of the month north of Dakota. On the 25th a slight fall in temper-

ature occurred in Montana and Wyoming. On the 26th the cold area extended from Manitoba to Kansas. The greatest changes were, 26° to 28° in Manitoba, and 14° to 22° in Kansas. On the 27th there was a fall in temperature of 14° to 20° in Wisconsin and Illinois. There was a fall in Nebraska and Kansas of 16° to 22° on the 28th; of 18° to 32° in Colorado on the 29th; 18° to 22° in northern Texas on the 29th. On the 30th the cold-wave extended southward over Texas, the fall in temperature being 20° to 24° in the interior and from 8° to 16° on the coast.

The following table exhibits in a concise manner some of the more prominent features noted in connection with the high areas:

No.	First observed.			Last observed.		Duration.	Velocity per hr.	Lowest pressure.			
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.	
		°	°	°	°	*Days.*	*Miles.*			*Inches.*	
I	....	48	109	47	64	3.0	36.1	3	Fort Sully, Dak	30.42	
II	....	50	107	42	80	4.5	12.5	7	Detroit, Mich	30.58	
III	....	46	112	40	72	4.5	20.8	8	Bismarck, Dak	30.34	
IV	....	50	96	45	64	6.0	11.1	16	Northfield, Vt	30.46	
V*a*	....	37	123	37	93	4.0	25.5	17	Eureka, Cal	30.44	
V*b*	....	51	103	44	63	4.0	23.5	22	Lansing, Mich	30.50	
VI	....	41	124	32	99	3.0	25.0	24	Denver, Colo	30.38	
VII	....	47	123	40	105	4.0	17.7	26	Calgarry, N. W. T	30.52	
Mean	....	....	....	....	....	4.1	21.5	....	....	30.45	

AREAS OF LOW PRESSURE.

On chart i the paths of the centres of thirteen areas of low pressure are shown, of which six first appeared in the British Possessions west of the ninety-fifth meridian; two developed over the middle plateau region; one pursued an irregular course southward from Colorado over New Mexico and western Texas; one advanced southward from north of Lake Huron; one is first charted on the west Gulf coast; one was first clearly defined over central Pennsylvania, and one apparently originated near the North Carolina coast. The low areas which appeared in the Canadian northwest territories pursued normal east to east-southeast paths to the Lake region. East of the eighty-fifth meridian and over the middle and southern Rocky Mountain regions the low areas, in instances, pursued abnormal paths, notably numbers iv, viii, and xii. The low areas traced exceeded in number the average number traced for April during the past sixteen years, and their average rate of advance was slow. Descriptions of disturbances of marked energy which attended the passage of the low areas charted are given under the heading "Local storms."

I.—This area was central on the morning of the 1st near Winnipeg; during the day it moved eastward to Lake Superior, and on the morning of the 2d it was near Port Huron. At this time it was separated by a low ridge of pressure from a low area (number ii) on the north Atlantic coast. The rain area extended from the upper lake region to New England. During the 2d these two areas, numbers i and ii, moved to the northeast and joined, the night map of the 2d showing the lowest pressure over Nova Scotia.

II.—This area is a continuation of the one described as number ix and ix*a* for March, 1889. The morning map of the 1st showed a trough of low pressure extending from southern New England southwestward to Tennessee, with the lowest pressure in eastern Pennsylvania. The rain area during the day, in connection with the rain in advance of area number i, covered all districts east of the Mississippi River. On morning of the 2d this storm was central on the Rhode Island coast, and during the day moved northeastward to Nova Scotia, having been joined by low area number i. The history of the movement of this area during the last two days of March is given in description of low area number ix and ix*a* for that month.

III.—This low area appeared north of Montana on the 1st. It moved in a direct southeasterly direction, passing over the Lakes on the 2d, and reaching the New Jersey coast on the night of the 3d, and thence moved to the northeast to Nova Scotia. Rain fell in Dakota on the 1st and snow accompanied by high northwest winds in Montana on the same date. The rain area over the Lakes produced by low area number i on the 2d was continued by this storm during the 3d, and extended eastward to New England and as far south as Virginia. High northwest winds prevailed over the Lake region on the 3d, the maximum velocity ranging from thirty to thirty-six miles per hour. On the 4th velocities of thirty-two miles per hour were reported on the New Jersey coast. No high velocities were reported from the New England coast during the passage of this storm.

IV.—This area appeared as a storm of slight intensity north of Lake Superior on the morning of the 4th. It moved southeastward accompanied by rain and snow, and caused moderately high winds over the Lake region on the 5th. The 8 p. m. map of this date showed the centre to be near Pittsburgh. An area of high barometer existed to the northeast of the centre and an area of still higher pressure over the upper lake region. There was a slight secondary development in Tennessee, and also a depression, north Atlantic storm number 4, midway between Bermuda and the Bahamas. Under the existing conditions the movement of the centre was abnormal for the latitude, as on the following morning the centre was near Raleigh, N. C., and probably joined north Atlantic storm number 4 after the morning of the 6th. High northerly winds prevailed over the Lake region during the night, accompanied over the lower lakes by snow. The snow area extended as far south as Cincinnati, Ohio, and Pittsburgh, Pa. Heavy rain occurred in Maryland, Virginia, and North Carolina during the night of the 5th, turning into snow on the morning of the 6th; it was still snowing at Lynchburgh, Va. at 8 p. m. The movement of the centre after the morning of the 6th was northeastward and it decreased in intensity. Velocities of forty to fifty-six miles per hour were reported from the middle Atlantic and New England coasts. The rain area did not reach New England until the 8th. Fair weather prevailed on the Atlantic coast during the 7th.

V.—This depression was of slight energy. It passed north of Washington Territory and Montana to Manitoba between the 4th and 7th. High south to west winds prevailed in Montana, Wyoming, and Dakota on the 5th and 6th. Rain occurred in Montana on the 5th and 6th, and in Wyoming, partly as snow, on the 6th and 7th.

VI.—This depression passed across the United States from Salt Lake City, Utah, to Virginia between the 10th and 13th, following closely the parallel of 40°. The centre was in Nebraska on the 11th; passed over Illinois, Indiana, and Ohio on the 12th, and reached the Atlantic coast on the 13th. General rains occurred west of the Mississippi on the 10th, with high southerly winds on the Texas coast. During the 11th the rain area extended to the Lake region. The rain continued over the Lake region on the 13th, and extended to the middle Atlantic states. High winds prevailed during the 12th over the upper lakes. The storm passed off the middle Atlantic coast on the 13th, with high northerly winds from Rhode Island to Cape Henry.

VII.—This storm appeared on the eastern coast of Texas on the morning of the 13th. On the 14th it passed over Mississippi and Alabama; was central on the Georgia coast on the 15th, and passed thence slowly up the coast, and was south of Nova Scotia on the 18th. Rain fell in the west Gulf states on the 13th, and in the east Gulf and south Atlantic states and the Ohio Valley on the 14th. The rain continued on the south Atlantic coast on the 15th and 16th. The rain area reached the middle Atlantic and southern New England states on the 17th. Wind velocities of thirty-six to sixty miles per hour were reported from the Gulf coast on the 14th. They were generally from the south, shifting to northwest during the night. On the 14th the winds on the south Atlantic coast were from the east, with velocities varying from thirty-two to forty-six miles per hour; they shifted to northerly on the 15th.

Velocities of thirty to forty-six miles per hour from the northeast were reported on the Atlantic coast during the passage of the storm on the 16th, 17th, and 18th.

VIII.—This area appeared as a slight depression in Colorado on the 15th; it moved into New Mexico on the 16th and there lost its motion of translation, the centre shifting only slightly; it remained nearly stationary until the 18th when, under increasing pressure from the north, it disappeared as a storm-centre. High southerly winds occurred in New Mexico and Texas on the 18th; velocities of thirty-four to thirty-six miles per hour were reported on the east coast of Texas.

IX.—This area appeared north of Dakota on the 17th; moved southward into southern Dakota on the 18th, and thence to the northeast on the 19th, reaching the Saint Lawrence Valley on the 20th. Rain occurred in the Missouri and upper Mississippi valleys on the 18th, and high northwest winds with velocities of twenty-six to thirty-six miles per hour in rear of the storm over the states and territories west of the Missouri. The rain area passed over the Lakes on the 19th, followed by northwest winds with velocities of twenty to thirty-six miles per hour. Rain fell on the New England coast on the 20th, with light winds from the southwest.

X.—This depression appeared north of Montana on the 19th; passed from Dakota to Lake Michigan on the 20th, and thence to and down the Saint Lawrence Valley on the 21st. The only precipitation was light rain on the New Jersey and New England coasts on the 21st. The winds in advance of the storm were light. After the wind had shifted to northwest, velocities of twenty-six to thirty-eight miles per hour were reported for Lake Michigan, and from twenty to twenty-six miles per hour on the lower lakes.

XI.—This low area was central north of Montana on the morning of the 22d; during the day it moved southeastward into Dakota; it passed over Minnesota on the 23d; over the Lake region on the 24th, and reached the Saint Lawrence Valley on the 25th. Light rains occurred in Wisconsin and Michigan on the 23d. On the 24th the rain area included with the above states Illinois, Missouri, and Arkansas. On the 25th general and heavy rainfalls occurred over the Lake region, and local rains in the east Gulf states. Southeast winds with velocities of twenty to thirty-two miles per hour were reported from Lakes Michigan and Huron on the 23d. On the 24th high southerly winds prevailed over the lower lakes. The winds during the night shifted to northwest over the upper lakes, and attained velocities of thirty-two to thirty-six miles per hour; thirty-two miles, from the south, was reported from Eastport, Me., 24th, and thirty-six miles from the north, 25th.

XII.—On the morning of the 25th, when low area number xi was north of the lower lakes, a trough of low pressure extended from the centre southward to South Carolina. A development took place in the southern part of the trough during the day, and the evening map of the 25th showed a storm of considerable energy central on the North Carolina coast. The intensity of this storm increased on the 26th as it passed slowly up the coast. On the 27th the centre was off the New Jersey coast. It moved thence north to the Saint Lawrence Valley on the 28th. On the 29th the centre passed to the southeast across Maine, then recurved and passed to the northeast over Nova Scotia on the 30th. Northeast gales, with heavy rain, prevailed on the middle Atlantic coast on the 26th and 27th, and on the New England coast on the 27th; the winds in the latter district shifting to south as the centre passed over New York to the Saint Lawrence Valley, and to the northwest on the 30th.

XIII.—This depression appeared in Utah on the 27th; during the 28th it moved southeastward to New Mexico, causing high southerly winds in western Texas and southern New Mexico. It continued its southerly course on the 29th. The southerly winds of the 28th had shifted to cold northerly, and general rain and snow occurred in Utah and Colorado. The winds on the Texas coast remained southerly and attained velocities of eighteen to thirty-two miles per hour; they shifted to the north on the 30th; thirty-four miles per hour from the north was the highest velocity reported this date.

The following table exhibits, in a concise manner, some of the more prominent characteristics of the low areas:

No.	First observed.			Last observed.		Duration.	Velocity per hr.	Lowest pressure.			
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	*Days.*	*Miles.*			*Inches.*
I.....	1	51	97	43	82	1.0	36.5	1	Saint Vincent, Minn....	29.34
II.....	1	41	77	46	58	2.0	25.0	3	Sydney, C. B. I.....	59.34
III.....	1	53	110	45	58	3.0	39.6	1	Calgarry, N. W. T.....	29.22
IV.....	4	50	88	45	59	6.0	18.7	10	Sydney, C. B. I.....	29.36
V.....	4	51	118	51	96	2.5	21.7	5	Medicine Hat, N. W. T.	29.32
VI.....	10	41	113	38	78	3.0	25.7	11	Concordia, Kans	29.42
VII.....	13	28	97	43	66	5.5	16.7	14	Vicksburg, Miss	29.50
VIII.....	15	39	104	35	105	3.5	16.1	17	Fort Stanton, N. Mex ..	29.50
IX.....	17	52	101	50	69	2.5	35.0	19	Port Arthur, Ont.....	29.42
X.....	19	51	105	49	68	2.0	39.6	21	Father Point, Quebec..	29.44
XI.....	22	53	108	48	75	3.5	23.2	24	Marquette, Mich.....	29.40
XII.....	25	36	75	47	58	5.0	15.0	26	Norfolk, Va.....	29.20
XIII.....	27	39	113	27	100	2.5	19.6	28	Montrose, Colo.....	29.42
Means.	.....	.....	.....	.....	.....	3.2	25.6	.....	.....	29.38

NORTH ATLANTIC STORMS FOR APRIL, 1889 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during April, 1889, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels, received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Seven depressions have been traced for April, 1889, of which four were continuations of areas of low pressure which first appeared over the North American continent; two are first charted northwest of the British Isles, and one apparently developed over or northeast of the Bahamas.

Over the western portion of the ocean the weather continued generally unsettled during a greater portion of the month, more especially off the coast of the United States, where severe disturbances attended the passage of areas of low pressure numbers iv, vii, and xii. Over mid-ocean relatively fair weather prevailed, and the periods of stormy weather, which extended from the 4th to 8th, 16th to 19th, 23d, 29th, and 30th, were not marked by gales of unusual violence. Over the eastern part of the ocean, and in the vicinity of the British Isles, low barometric pressure and gales of varying force were reported from the 3d to 14th, 20th to 24th, and 26th to 30th, the severest storms occurring during the first and the latter part of the third decades of the month.

As compared with the corresponding month of previous years the storms of the north Atlantic during April, 1889, were deficient in number, the average number traced during the last six years being 9.2. The lowest barometric pressure was reported south or southwest of the British Isles on the 6th, 8th, and 30th, when readings falling to about 29.20 (742) were noted. Over mid-ocean the lowest pressure, about 29.60 (752), was reported on the 7th, while over the western part of the ocean the minimum readings reported during the passage of the more important depressions varied from 29.30 (744) to 29.50 (749).

The following are brief descriptions of the depressions traced during April, 1889:

1.—This depression appeared northwest of Ireland on the 3d, to which position it had apparently advanced from the